



MATERIAL APPLICATION & SAFETY DATASHEET

Future

No Clean Cored Solder Wire



Product Name:

Future No Clean Cored Solder Wire

Manufactured By:

Warton Metals Limited
Grove Mill Commerce Street
Haslingden Lancashire England

Tel: + 44 (0) 1706 218888

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Description

Future is a flux "core" contained within a **Warton High Purity Solder Wire**. The Future range of No Clean Cored Solder is available in a halide free formulation and two flux percentages:- fast flow 2% and low residue 1%. Future types exhibit the absolute minimum of clear residue after soldering with no offensive odours generated during the soldering operation.

Future Flux Types.

Future flux type HF is formulated and manufactured using a unique modified rosin.

Future HF (Halide Free)

Available as 2% and 1% flux content. Future HF is formulated without the use of halides, suitable for

applications where a products long term reliability requires the use fluxes to the RMA specification. Future HF eliminates any long term corrosion potential.

| | | | |
|-----------|-----|------|---------------------------------------------------------------------------|
| Future HF | RMA | Zero | BS 441 Rosin Class 5B, DTD 599A, QQS 571E-RMA DIN 8511 Type F-SW32. |
|-----------|-----|------|---------------------------------------------------------------------------|

High Purity Solder Alloy

Standardisation is important to reduce variety and to promote the quality of products by defining features and characteristics governing their fitness for purpose. The standards promote clear unambiguous communication between purchasers and suppliers for quotation ordering and supply purposes.

In 1994 a single European standard, EN 29453 (ISO 9453), superseded all other European national standards, BS 219, DIN 1707, NFC 90-550. Other equivalent international standards include QQS 571E, ASTM B32 and JIS-Z-3382.

The table above illustrates the equivalent **Warton High Purity Solder Alloy** in relationship to EN 29453, QQS-571E, BS-219 and DIN-1707.

| Warton Part No: | EN 29453 | QQS 571E | BS 219 *DIN 1707 |
|-----------------|----------|-------------|------------------|
| 63/37 | 1a | Sn63Pb37 | AP |
| 60/40 | 2a | Sn60Pb40 | KP |
| 50/50 | 3a | Sn50Pb50 | F |
| 45/55 | 4 | - | R |
| 40/60 | 5 | Sn40Pb60 | G |
| 35/65 | 6 | Sn35Pb65 | H |
| 30/70 | 7 | Sn30Pb70 | J |
| 20/80 | - | Sn20Pb80 | V |
| 15/85 | - | - | W |
| 99C | 23 | - | 99C |
| 97C | 24 | - | - |
| Alloy No 1 | 26 | - | *Sn50PbCu |
| Alloy No 2 | 25 | - | *Sn60PbCu2 |
| HMP 5S | 34 | - | 5S |
| LMP 62S | 30 | Sn62Pb36Ag2 | 62S |
| 96S | 28 | Sn96Ag04 | 96S |
| 95A | 18 | Sn95Sb5 | 95A |
| TLS/5 | - | - | - |
| SAC3 | - | - | - |
| TSC | - | - | - |

Warton High Purity Solder Alloys are manufactured using only the 'Highest Purity Virgin Materials' this being part of Warton's simple philosophy that the best raw materials lead to the best finished products.

Below shows a typical batch analysis of the High Purity Tin/Lead used in manufacturing **High Purity 63/37**.

Typical batch analysis: High Purity Tin

| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| Sn | Sb | Pb | Cu | Zn |
| 99.95 | 0.009 | 0.002 | 0.0002 | 0.0001 |
| Fe | As | Ag | Bi | In |
| 0.002 | 0.002 | 0.0001 | 0.0001 | 0.0003 |

Typical batch analysis: High Purity Lead

| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| Sn | Sb | Pb | Cu | Zn |
| 0.001 | 0.002 | 99.99 | 0.003 | 0.0001 |
| Fe | As | Ag | Bi | In |
| 0.002 | 0.0005 | 0.002 | 0.005 | 0.0003 |

Typical batch analysis: Warton High Purity 63/37

| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| Sn | Sb | Pb | Cu | Zn |
| 63.0 | 0.0095 | rem | 0.0007 | 0.0002 |
| Fe | As | Ag | Bi | In |
| 0.002 | 0.001 | 0.0005 | 0.0003 | 0.0003 |

These consistent high standards apply to all **Warton High Purity Solder Alloys**.

Solder Alloys Containing Lead

| Warton Part No | Sn % Tin | Pb % Lead | Cu % Copper | Ag % Silver | Sb % Antimony |
|----------------|-----------|-----------|-------------|-------------|---------------|
| 63/37 | 62.5-63.5 | Rem | - | - | - |
| 60/40 | 59.5-60.5 | Rem | - | - | - |
| 50/50 | 49.5-50.5 | Rem | - | - | - |
| 45/55 | 44.5-45.5 | Rem | - | - | - |
| 40/60 | 39.5-40.5 | Rem | - | - | - |
| 35/65 | 34.5-35.5 | Rem | - | - | - |
| 30/70 | 29.5-30.5 | Rem | - | - | - |
| 20/80 | 19.0-20.0 | Rem | - | - | - |
| 15/85 | 14.0-15.0 | Rem | - | - | - |
| Alloy No 1 | 49.5-50.5 | Rem | 1.2-1.6 | - | - |
| Alloy No 2 | 59.5-60.5 | Rem | 1.6-2.0 | - | - |
| HMP 5S | 4.8 - 5.2 | Rem | - | 1.2-1.8 | - |
| LMP 62S | 61.5-62.5 | Rem | - | 1.8-2.2 | - |
| TLS/5 | 4.8-5.2 | Rem | - | 0.8-1.2 | - |
| Sn10Pb88Ag2 | 10 | 88 | - | 2 | - |

Lead Free Solder Alloys

In response to increasing environmental awareness and the drive for new legislation (forcing greater end of product life responsibility), Warton Metals offer a complete range of 'lead free' alloys to suit all applications. See table below.

| Warton Part No | Sn % Tin | Cu % Copper | Ag% Silver | Sb % Antimony |
|----------------|----------|-------------|------------|---------------|
| 99C | Rem | .45 - .9 | - | - |
| 97C | Rem | 2.5-3.5 | - | - |
| 96S | Rem | - | 3.5-4.0 | - |
| 95A | Rem | - | - | 4.5-5.5 |
| TIN | 100 | - | - | - |
| TSC | 95.5-96 | 0.5-1 | 3.3-4 | - |
| SAC3 | Rem | 0.4-0.6 | 2.8-3.2 | - |

The table above shows the elements included in each alloy.

Other important properties when selecting the correct alloy are the working temperatures and the ultimate strength of the soldered joint.

The following table shows both working temperatures and ultimate tensile strength of Warton material. The table indicates that a maximum in tensile strength exists in the eutectic composition. The ultimate tensile strengths listed below refer to the bulk solder. The values are only a guide to the relative strength of identical joints made with the solder alloys at room temperature. The table should not be used to calculate exact joint strengths, which depend on a number of factors.

| Warton Part No | Melting range °C | Min junction temp °C | N/mm ² | Tons/In ² |
|----------------|------------------|----------------------|-------------------|----------------------|
| 63/37 | 183 | 245 | 67 | 4.3 |
| 60/40 | 183-188 | 248 | 48 | 3.1 |
| 50/50 | 183-212 | 272 | 47 | 3.1 |
| 45/55 | 183-224 | 284 | 47 | 3.1 |
| 40/60 | 183-234 | 294 | 47 | 3.1 |
| 35/65 | 183-244 | 304 | - | - |
| 30/70 | 183-255 | 315 | 49 | 3.2 |
| 20/80 | 183-275 | 335 | 51 | 3.3 |
| 15/85 | 227-288 | 348 | 49 | 3.2 |
| 95A | 236-243 | 303 | 31 | 2.0 |
| 97C | 230-250 | 310 | - | - |
| Alloy No. 1 | 183-215 | 275 | 55 | 3.5 |
| Alloy No.2 | 183-190 | 250 | - | - |
| HMP 5S | 296-301 | 361 | 36 | 2.3 |
| LMP 62S | 179 | 239 | 92 | 5.9 |
| 96S | 221 | 281 | 54 | 3.5 |
| TLS/5 | 296-301 | 361 | - | - |
| TSC | 217 | - | - | - |
| Sn10Pb88Ag2 | 268-290 | - | - | - |
| SAC3 | 217-219 | - | - | - |

Wire gauge (Diameter)

The wire gauge (diameter) for **Warton Future** is represented as SWG. (Standard wire gauge) The equivalent imperial and metric values are shown below.

| Swg | 10 | 11 | 12 | 13 | 14 |
|------|-------|-------|-------|-------|-------|
| mm | 3.25 | 2.95 | 2.64 | 2.34 | 2.03 |
| Inch | 0.128 | 0.116 | 0.104 | 0.092 | 0.080 |

| Swg | 16 | 18 | 20 | 21 | 22 |
|------|-------|------|-------|-------|-------|
| mm | 1.63 | 1.22 | 0.914 | 0.813 | 0.711 |
| Inch | 0.064 | 0.04 | 0.036 | 0.032 | 0.028 |

| Swg | 24 | 26 | 28 | 30 | 32 |
|------|-------|-------|-------|-------|-------|
| mm | 0.599 | 0.457 | 0.376 | 0.315 | 0.274 |
| Inch | 0.022 | 0.018 | 0.014 | 0.012 | 0.010 |

Packaging

Warton Future Cored Solder Wire is supplied on 0.25Kg, 0.5Kg, 2.5Kg, 3Kg, 5Kg, 10Kg, 15Kg and 25Kg reels.



Material Safety Datasheet

Future No Clean Cored Solder Wire

(All alloys, gauges and flux percentages)

| Section 1. Identification of the substance / preparation and of the company / undertaking | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Product Name: | Future No Clean Cored Solder Wire |
| Manufactured By: | Warton Metals Limited Grove Mill, Commerce Street. Haslingden. Lancashire. BB4 5JT. ENGLAND. |
| Emergency Telephone: | +44 (0)1706 218888 |
| Emergency Fax: | +44 (0)1706 221188 |
| Warton's product coding system precisely defines the features of a particular type of solder wire. For example: Future HF Fast Flow 2% 63/37 22 swg No Clean Cored Solder. 'Future HF No Clean Cored Solder Wire' denotes the product name and flux type, 'Fast Flow 2%' is the percentage of flux in the wire, '63/37' is the alloy (please see table below) and '22swg' is the standard wire gauge size. | |

| Section 2. Composition / Information on Ingredients | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------|---------------------|-----------------------|-----------------------|
| Flux cored solder wire is considered to be an article and is not subject to the classification (Hazard Information and Packaging for Supply) Regulations 1994, because it is not hazardous as supplied. However this product may be hazardous in use and the information in this datasheet - reflects the hazards associated with the solder reflow operations. | | | | | |
| Ingredient | CAS No: | Classification Symbol | Risk phrases | Safety Phrases | % Present |
| Lead (dusts, heated vapours, fumes). | 7439-92-1 | T | 20/22-33-61 | | See alloy table below |
| Modified Rosins: | 8050-09-7 | Xn | 42/43 | dependent on flux % | |
| R20/22 - Harmful by inhalation and if swallowed. | | | | | |
| R33 - Danger of cumulative effects. | | | | | |
| R42/43 - May cause sensitisation by inhalation and skin contact. | | | | | |
| R61 - May cause harm to unborn child. | Please use table below to determine the elements present in the alloy. | | | | |
| Warton Part No | Tin (Sn) % | Lead (Pb) % | Copper (Cu) % | Silver (Ag) % | Antimony (Sb) % |
| 63/37 | 62.5-63.5 | Rem | - | - | - |
| 60/40 | 59.5-60.5 | Rem | - | - | - |
| 50/50 | 49.5-50.5 | Rem | - | - | - |
| 45/55 | 44.5-45.5 | Rem | - | - | - |
| 40/60 | 39.5-40.5 | Rem | - | - | - |
| 35/65 | 34.5-35.5 | Rem | - | - | - |
| 30/70 | 29.5-30.5 | Rem | - | - | - |
| 20/80 | 19.0-20.0 | Rem | - | - | - |
| 15/85 | 14.0-15.0 | Rem | - | - | - |
| 99C | Rem | - | .45 - .9 | - | - |
| 97C | Rem | - | 2.5-3.5 | - | - |
| Alloy No 1 | 49.5-50.5 | Rem | 1.2-1.6 | - | - |
| Alloy No 2 | 59.5-60.5 | Rem | 1.6-2.0 | - | - |
| HMP 5S | 4.8 - 5.2 | Rem | - | 1.2-1.8 | - |
| LMP 62S | 61.5-62.5 | Rem | - | 1.8-2.2 | - |
| 96S | Rem | - | - | 3.5-4.0 | - |
| TLS/5 | 4.8-5.2 | Rem | - | 0.8-1.2 | - |
| 95A | Rem | - | - | - | 4.5-5.5 |
| TSC | 95.5-96 | - | 0.5-1 | 3.3-4 | - |
| SAC3 | Balance | - | 0.4-0.6 | 2.8-3.2 | - |

| Section 3. Hazards Identification | |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Inhalation of the flux fumes given off at soldering temperatures will irritate the nose and throat. Repeated or prolonged exposure to flux fumes may cause an allergic reaction leading to occupational asthma. Solder alloys containing lead give off negligible lead fume at normal soldering temperatures and at temperatures up to 500°C. Lead is harmful if absorbed into the body and can cause birth defects and other reproductive harm. |

| Section 4. First Aid Measures | |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inhalation: | Flux fumes emitted during soldering will irritate the nose and throat and may cause an asthmatic type reaction. Remove affected person to fresh air, obtain medical attention if there is any respiratory distress. |
| Skin Contact: | Rosin and rosin derivatives can cause a rash to develop. If any skin irritation develops seek medical advice. Wash hands with soap and warm water after handling solder wire. |
| Eye Contact: | Flux fumes may irritate the eyes. The flux may spit during soldering. Flush immediately with plenty of water, ensure that the eyeball and the inside of the eyelids are properly bathed by gently prising open the eyelids. |
| Ingestion: | Not relevant |

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| Section 11. Toxicological Information (toxic effects arising from exposure based on experimental and non experimental data) | |
| Acute Toxicity: | The flux fumes produced during soldering will irritate the nose and throat. For personnel that have become sensitised to rosin fumes, exposure can cause symptoms of asthma attacks of wheezing), chest tightness and breathlessness - alveolitis breathlessness and flu like symptoms), or rhinitis and conjunctivitis (runny or stuffy nose and watery or prickly eyes typical of hay fever). Rosin can also cause sensitisation by skin contact causing dermatitis. Lead can cause weakness, vomiting, loss of appetite, convulsions and stupor. Prolonged and / or repeated exposure to flux fumes may cause some workers to develop an allergic reaction to them (become sensitised). |
| Chronic Toxicity: | Lead can cause weakness, insomnia, hypertension, headaches and pains in the joints. Chronic exposure to lead may result in damage to the blood - forming, nervous, urinary and reproductive systems. Lead is classified as a 2B carcinogen by the IARC (1987). Evidence for carcinogenicity is adequate in animals but inadequate in humans. |
| Reproductive Toxicity: | The placenta offers no barrier to the transport of lead from the mothers blood stream to that of the foetus. |
| LD50 (Oral rat): | Modified rosin >2500mg/Kg. |

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|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 12. Ecological Information | |
| (Possible environmental effects and behaviour /ODP/aquatic toxicity): | Lead is not degradable and will persist in the environment. Lead is insoluble in water and is not attacked by most inorganic acids and bases. (See section 13. Disposal Considerations). |

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| Section 13. Disposal Considerations | |
| (Safe disposal of product, its residues and packaging materials): | Waste solder wire (if any) should be put in metals tins and returned to Warton for disposal. Disposal should be in accordance with the relevant local and national legislation. In the UK this is the Control Of Pollution Act 1974, the Environmental Protection Act 1990 and regulations made under them. See also Sections 7 & 8 for handling precautions and personal protection where applicable. |

| | |
|------------------------------------------|----------------------------------------------------------------|
| Section 14. Transport Information | |
| | Solder Wire is not classified as hazardous for transportation. |

| | |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 15. Regulatory Information | |
| | Flux cored solder wire is considered to be an article and is not subject to the classification (Hazard Information and Packaging for Supply) Regulations 1994, because it is not hazardous as supplied. However this product may be hazardous In use and the information in this datasheet - reflects the hazards associated with the solder reflow operations. |

| | |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 16. Other Information | |
| Recommended uses and restrictions: Publications references: | Use only as directed. Compiled in accordance with CHIP 2 Regulations 1994. HSE Approved Code Of Practise, document L62. Dangerous Substances Directive 57/548/EEC as amended by directive 92/32/EEC. Dangerous Preparations Directive 88/379/EE as amended by Directive 90/492/EEC Lead at Work Directive 82.605/EEC. The Health & Safety at Work Act 1974. The Control Of Lead at Work Regulations 1980. The Control of Substances Hazardous to Health Regulations 1994. The Management of Health and Safety at Work Regulations 1992. The Management of Health and Safety at Work (Amendment) Regulations 1994. HS (G) 37: An Introduction to Local Exhaust Ventilation. HS (G) 53: Respiratory Protective Equipment - A practical guide for users. HS (G) 65: Successful Health & Safety Management's. HS (G) 97: A Step by step Guide to the Coshh Regulations. EH26: Occupational Skin Diseases: health and safety Precautions. EH40: Occupational exposure limits. Revised annually. MS24: Health Surveillance of Occupational Skin Disease. MS25: Medical aspects of occupational asthma. IND (G) 95 (L) Respiratory Sensitises: A Guide For Employers. Health Surveillance under COSHH: Guidance for employers Approved Code of Practise - Management of Health & Safety at Work. |

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|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Section 17. Revision Dates | |
| Revised Date / Initials: | 10/05 / VHM |
| Replacing: | All previous health and safety datasheets |
| Legend: | N/A = Not applicable or available at time of printing. N/D = Not determined or not determinable. Est. = Estimated Rem=Remainder |

The information and recommendations on this sheet relate to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. The information is given in good faith and the best of Warton Metals Ltd knowledge, information and believed accurate and reliable at the time of preparation. Nothing herein is to be construed as a guarantee, express or implied in all cases it is the responsibility of the user to determine the applicability of this information or the suitability of the products for his own particular purposes.

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